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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: D'Elia et al. Examiner: Peralta, G.
Serial No.: 09/575,349 Group Art Unit: 2814
Filed: May 19, 2000 Docket No.: AMDA.474PA
Title: CVD GAS INJECTOR AND METHOD THEREFOR

#13 Appeal Brief
M. Brunson

12/19/02

CERTIFICATE UNDER 37 CFR 1.8 The undersigned hereby certifies that this correspondence and the papers, as described hereinabove, are being deposited in the United States Postal Service in triplicate, as first class mail, in an envelope addressed to: Assistant Commissioner for Patents, Washington, D.C. 20231, on November 18, 2002.

By Erin M. Nichols
Erin M. Nichols

APPEAL BRIEF

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

This is an Appeal Brief submitted pursuant to 37 CFR §1.192 for the above-referenced patent application and is being filed in triplicate.

I. Real Party in Interest

The real party in interest is Advanced Micro Devices, Inc., having a place of business at One AMD Place, P.O. Box 3453, Sunnyvale, California. The above referenced patent application is assigned to Advanced Micro Devices, Inc.

II. Related Appeals and Interferences

There are no related appeals or interferences.

III. Status of Claims

Claims 18-30 are being presented for appeal. Claims 18-27 stand rejected under §103(a) in view of *Jeng et al.* (U.S. Patent No. 5,710,073 in view of *Bartholomew et al.* (U.S. Patent No. 6,143,080); and claims 27-30 stand rejected but without explanation from the Examiner. The pending claims presented for appeal, as presently amended, may be found in the attached Appendix of Appealed Claims.

IV. Status of Amendments

The application was initially filed on May 19, 2000, including claims 1-30. In reply to a first Office Action mailed September 26, 2001, including a Restriction Requirement, an Office Action Response was filed on October 8, 2001, *inter alia*, electing Group II claims (claims 19-30). A second Office Action withdrawing Claims 1-17 from further consideration, but permitting linking claim 18 to be examined with the elected invention, was mailed January 16, 2002. An Office Action Response was filed on April 16, 2002. On July 16, 2002 a Final Office Action was mailed, and in reply an Office Action Response was filed on September 11, 2002 by facsimile. An Advisory Action was mailed on October 8, 2002 maintaining the final rejections, and a Notice of Appeal was filed on October 15, 2002.

V. Summary of Invention

One embodiment of Appellant's invention is directed to a method for forming a coating on a surface of a semiconductor wafer (220) in a CVD arrangement (200) that includes supplying gas to the surface of the wafer (220) using a gas injector (210) adapted to maintain uniform supply of the gas in a zone of the CVD arrangement (200) that would exhibit a depleted gas supply absent the injector (210). The supplied gas is used in combination with selected reactants to deposit a coating on the wafer (220).

Other embodiments include an anti-reflective coating having a k value of refractive index between 0.6 and 0.8, adjusting the gas injector to maintain a uniform gas supply, including a gas concentration detector, removing the gas concentration detector prior to depositing the coating, and detecting the concentration of the supplied gas while operating the CVD arrangement under simulated processing conditions.

VI. Issues for Review

Issue 1: Is the §103(a) rejection of claim groups 4-6 proper when the Examiner failed to clearly state the reasons for the rejection so as to be useful to Appellant in judging the propriety of the rejection as required by 35 U.S.C. §132?

Issue 2: Is the §103(a) rejection of claim groups 4-6 proper when the Examiner failed to take note of the Appellant's arguments presented in the Office Action

Response filed on September 11, 2002 and answer the substance thereof, as indicated in M.P.E.P. §707.07(f)?

Issue 3: Is the §103(a) rejection of claim groups 1-6 proper when the asserted combination of references (*Jeng et al.* '073 in view of *Bartholomew et al.* '080) fails to teach or suggest every element of the claimed invention?

Issue 4: Is the §103(a) rejection of claim groups 1-6 over the asserted combination of references (*Jeng et al.* '073 in view of *Bartholomew et al.* '080) proper when the Examiner failed to cite any evidence of motivation in the prior art to modify the '073 reference?

Issue 5: Is the rejection introduced in the Advisory Action proper when the Examiner failed to present the rejection in a timely manner and the substance is erroneous?

VII. Grouping of Claims

For purposes of this appeal, claims 18-23 and 25-26 are in group 1, claim 24 is in group 2, claim 27 is in group 3, claim 28 is in group 4, claim 29 is in group 5, and claim 30 is in group 6. The claims as now presented do not stand or fall together.

VIII. Argument

The claims in group 1 are separately patentable over the prior art because they are directed to subject matter that includes supplying gas to the surface of a wafer in a zone of a CVD arrangement that exhibits a depleted gas supply absent an injector, which is not taught by the prior art. Claim 24 in group 2 is separately patentable over the prior art and the other claim groups because it is directed to subject matter that includes depositing an anti-reflective coating having a k value of refractive index that is between about 0.6 and 0.8, which is not necessarily present in the other claim groups and not taught by the cited prior art. Claim 27 in group 3 is separately patentable over the prior art and the other claim groups because it is directed to subject matter that includes adjusting a gas injector to maintain uniform gas supply, which is not necessarily present in the other claim groups and not taught by the cited prior art. Claim 28 in group 4 is separately patentable over the prior art and the other claim groups because it is directed to subject matter that includes providing at least one gas concentration detector in the CVD arrangement and detecting the

concentration of the supplied gas using the detector, which is not necessarily present in the other claim groups and not taught by the cited prior art. Claim 29 in group 5 is separately patentable over the prior art and the other claim groups because it is directed to subject matter that includes removing the at least one gas concentration detector from the CVD arrangement after detecting the concentration of the supplied gas, which is not necessarily present in the other claim groups and not taught by the cited prior art. Claim 30 in group 6 is separately patentable over the prior art and the other claim groups because it is directed to subject matter that includes operating the CVD arrangement under simulated processing conditions, which is not necessarily present in the other claim groups and not taught by the cited prior art.

Issue 1: The §103(a) rejection of claim groups 4-6 is not proper when the Examiner failed to clearly state the reasons for the rejection so as to be useful to Appellant in judging the propriety of the rejection as required by 35 U.S.C. §132.

With respect to claims 28-30, Appellant submits that the claims are allowed as the Office Action does not recite a rejection in connection with claims 28-30. Neither Office Action dated January 16, 2002 or dated July 16, 2002 recites a rejection of claims 28-30. Claims 28-30 are indicated on the cover sheet of each Office Action as standing rejected with all other claims, but claims 28-30 are not mentioned elsewhere. Appellant submits that maintaining a rejection of claims 28-30 without any explanation is improper and cannot stand as it violates current U.S. patent laws, including, but not limited to, 35 U.S.C. §132 and 37 C.F.R. §1.104(a)(2). More particularly, the bald rejection of claims 28-30 does not specifically disclose the corresponding portions of the cited reference(s), if any, that allegedly teach each respective claimed limitation, thus failing to satisfy the requirements of 37 CFR §1.104(c)(2) (the examiner must cite the best references when rejecting claims), failing to satisfy M.P.E.P. § 707.07(i) ("In every office action, each pending claim should be mentioned by number, and its treatment or status given"), and failing to satisfy M.P.E.P. § 707.07(d) ("Where a claim is refused for any reason relating to the merits thereof it should be 'rejected' and the ground of rejection fully and clearly stated . . .") (emphasis added).

Because the Office Action fails to notify Appellant of the reasons for the rejection of claims 28-30, Appellant has been deprived of the opportunity to judge the propriety of these rejections and fully respond thereto. Without asserting any basis for rejecting the claims, and failing to assert any references against said claims, the Examiner has failed his initial burden of establishing a *prima facie* case of anticipation or obviousness. Appellant submits that absent grounds of rejection, claims 28-30 are allowed.

Issue 2: The §103(a) rejection of claim groups 4-6 is not proper when the Examiner failed to take note of the Appellant's arguments presented in the Office Action Response filed on April 16, 2002 and answer the substance thereof, as indicated in M.P.E.P. §707.07(f).

The Examiner failed to address the traversal of the asserted combination of the '073 reference with the '080 reference as presented by the Appellant in the Office Action Response filed on April 16, 2002. M.P.E.P. §707.07(f) states, in pertinent part, the following:

Where the requirements are traversed, or suspension thereof requested, the examiner should take proper reference thereto in his or her action on the amendment. Where the applicant traverses any rejection, the examiner should, if he or she repeats the rejection, take note of the applicant's argument and answer the substance of it. If a rejection of record is to be applied to a new or amended claim, specific identification of that ground of rejection, as by citation of the paragraph in the former Office letter in which the rejection was originally stated, should be given.

In this regard, M.P.E.P. §707.07(f) indicates that the Examiner should take note of the Appellant's argument regarding the impropriety of the asserted combination and answer the substance of it. This is consistent with the purpose of aiding the Appellant in judging the propriety of continuing the prosecution, as indicated in 37 C.F.R. §1.104(a)(2) and discussed above.

In this instance, the Examiner did not comply with this requirement, and the Appellant was not afforded the opportunity to judge the propriety of the §103(a) rejection and to form a response thereto. The Examiner failed to respond to Appellant's argument that the instant invention must be examined "as a whole." Appellant argued that each of the claims, for example claims 18 and 19, include limitations with respect to the depleted gas supply. These limitations are not aligned with the prior art in any manner in the Office

Action. Therefore, Appellant requests that the finality of the Office Action mailed on July 16, 2002 be removed, that the Examiner address Appellant's arguments, and that Appellant have an opportunity to respond thereto, should the rejection be maintained.

Issue 3: The §103(a) rejection of claim groups 1-6 is not proper when the asserted combination of references (*Jeng et al.* '073 in view of *Bartholomew et al.* '080) fails to teach or suggest every element of the claimed invention.

With respect to the §103(a) rejection of the above-mentioned claim groups, Appellant respectfully submits that the rejection is improper because the cited references (the *Jeng* '073 reference in view of the *Bartholomew* '080 reference) fail to establish a *prima facie* case of obviousness. A *prima facie* case of obviousness requires a complete correspondence between the asserted prior art and the claimed invention. The prior art references must teach or suggest all of the claim limitations. M.P.E.P. § 2143. In this case, neither of the cited references addresses the same problem as the claimed invention, or show all aspects claimed; therefore, the references, either individually or in combination, cannot be used to maintain the rejection under §103(a). Specifically, Appellant fails to see among the cited reference portions, *inter alia*, a teaching or suggestion of features completely corresponding to the claimed limitations of supplying a uniform supply of gas in a zone of a CVD arrangement that exhibits a depleted gas supply absent an injector. The Office Action dated July 16, 2002 (hereinafter referred to as Office Action) acknowledges that the '073 reference fails to teach the introduction of the gases through a sensor or detector. Therefore, the Office Action fails to establish a *prima facie* case of obviousness with respect to the claimed invention and Appellant requests that the §103(a) rejection be removed.

Additionally, the Office Action alleges:

Bartholomew et al. teaches a method that comprises adjusting a gas injector in a CVD arrangement by providing at least one gas concentration detector in a CVD arrangement in the form of a sensor that measures flow characteristics of at least one of the gases in the gas flow path (col. 4, ll 48-55), and in response, to the detected characteristic, the gas injector is adjusted, wherein the detector is removed from the CVD arrangement after detecting the concentration of the supplied gas.

Office Action, ¶ 2, pp. 2-3. However, the cited portion of the '080 reference does not teach or suggest adjusting a gas injector (Appellant's claims 27 and 28), does not teach or suggest a

gas concentration detector (Appellant's claims 28 and 29), does not teach or suggest removing the gas concentration detector from the CVD arrangement after detecting a concentration (Appellant's claim 29), and does not teach or suggest detecting the concentration of the supplied gas (Appellant's claim 30) as asserted by the Examiner. Nor do any other portions of the '080 reference teach the above-mentioned asserted features.

Moreover, the '080 reference is directed to a completely different problem than the present invention. The '080 reference concerns maintaining a substantially constant exhaust flow rate in various regions (*see, e.g.*, Abstract, col. 2, lines 8-10 and 15-20; col. 5, lines 10-14 ("effluent gas stream"); col. 10, lines 25-27 ("load and unload exhaust gas paths"), lines 35-43; Figures 1, 4 and 5; Claim 1 ("an exhaust flow control system")), whereas the present invention is directed at delivering a uniform supply of gas to a zone in the CVD arrangement via an injector having spatially well-placed injection holes, rather than simply by controlling flow rate to be constant (*see, e.g.*, Figs. 1-4 of the instant application). Monitoring and controlling the gas flow exhaust path does not correspond to the claim limitations regarding using an injector to supply gas uniformly to a zone that would otherwise exhibit a depleted gas supply. Therefore, the '080 reference does not address the limitations involving depletion of gas supply in the CVD arrangement as claimed, and the §103(a) rejection of claim groups 1-6 should be removed.

Specifically regarding claim group 2, the Appellant further fails to see where the cited references teach or suggest the claimed limitation of the anti-reflective coating being deposited having a k value of refractive index that is between about 0.6 and 0.8. As acknowledged by the Examiner (Office Action, ¶ 2, p. 2), the '073 reference teaches depositing an anti-reflective coating (ARC) having a k value between 0.3 and 0.5, which does not overlap with, and thus does not teach or suggest, the claimed k value range. Therefore, the Examiner has not established a *prima facie* case of obviousness and requests that the §103(a) rejection be removed.

Specifically regarding claim groups 3-6 (to the extent that the §103(a) rejection includes claims 28-30), Appellant fails to see where the cited references teach or suggest the claimed limitation of adjusting the gas injector to maintain the uniform gas supply. The Examiner alleges that the '080 reference teaches, *inter alia*, adjusting the gas injector. Office Action, ¶ 2, pp. 2-3. However, the cited portion of the '080 reference (col. 4, lines 48-55) refers to Figure 1, and describes a flow control system (14a) that includes a sensor (20) for

measuring a flow characteristic of the at least one gas in the gas flow exhaust path (18) downstream from the chamber exhaust plenum, and a controller (22) which receives an output from the sensor (20). The controller (22) selectively adjusts a flow control device (24), in the illustrated instance, a 1st MKS valve (24). Figures 4 and 5 of the '080 reference clearly show delta-pressure sensors controlling various valves (*e.g.*, load MKS valve (64), unload MKS valve (70), and 2nd MKS valve (26)) external to the deposition chamber(s), and does not teach or suggest the controller (22) adjusting an injector (*e.g.*, injector (40) in Figures 2 and 3A). Thus, the '080 reference teaches adjusting valves to maintain a constant exhaust flow, and does not teach or suggest that such flow control is or could be done by adjusting the gas injectors (*e.g.*, injector (40) in Figures 2 and 3A), as claimed. Therefore, Appellant submits that a *prima facie* case of obviousness has not been established, and requests that the §103(a) rejection be removed.

Specifically regarding claim groups 4-6 (to the extent that the §103(a) rejection includes claims 28-30), Appellant fails to see where the cited references teach or suggest the claimed limitation of providing at least one gas concentration detector in the CVD arrangement and detecting the concentration of the supplied gas using the detector as mentioned above. Although the Examiner suggests that the '080 reference teaches "providing at least one gas concentration detector in the CVD arrangement" (Office Action, ¶ 2, p. 2), the '080 reference does not mention a gas concentration detector, or the use thereof. Instead, the cited portion of the '080 reference (col. 4, lines 48-55) teaches "measuring a flow characteristic of the at least one [exhaust] gas flow path," further illustrated by suggesting a suitable sensor to be a pressure transducer arranged across an orifice. Indeed, the balance of the '080 reference also describes measuring gas flow (*i.e.*, rate) characteristics. Because the '080 reference is concerned with maintaining a constant flow rate, Appellant respectfully submits that measuring "flow" intends a literal interpretation, gas concentration not being one of the measurable characteristics of flow (*i.e.*, rate of transport). As mentioned, the '080 reference teaches measuring volumetric gas flow itself (the rate of transport of the gas), such as by the well-known method of measuring a pressure differential across an orifice. Col. 4, lines 48-58; col. 5, lines 10-14; Fig. 1 (*see e.g.*, Ref. Nos. 23, 23a, and 23b), Figs. 4 and 5 (*see e.g.*, Ref. Nos. 60/61, 66/67, and 72/73). Since the '080 reference does not teach or suggest measuring gas concentration via its

discussion of measuring flow. Appellant respectfully submits that the Examiner has misinterpreted and mischaracterized the teachings of the '080 reference, thereby failing to establish a *prima facie* case of obviousness.

Furthermore with respect to claim groups 4-6, Appellant fails to see where the '080 reference teaches or suggests the claimed limitation of detecting the concentration of the supplied gas. Very clearly, the '080 reference teaches making gas measurements in the exhaust gas flow. See e.g., Abstract, col. 2, lines 8-10 and 15-20; col. 5, lines 10-14 ("effluent gas stream"); col. 10, lines 25-27 ("load and unload exhaust gas paths"), lines 35-43; and Claim 1 ("an exhaust flow control system"). Figures 1, 4 and 5 all show the locations of gas flow measurements in these exhaust pathways, consistent with the written description. Monitoring the gas flow exhaust path does not correspond to the claim limitations detecting the concentration of the supplied gas. Therefore, a *prima facie* case of obviousness has not been established, and Appellant requests that the §103(a) rejection be removed.

Specifically regarding claim groups 5-6 (to the extent that the §103(a) rejection includes claims 29-30), Appellant fails to see where the cited references teach or suggest the claimed limitation of removing the at least one gas concentration detector. The Examiner did not cite a particular portion of either reference that teaches this feature. The '080 reference teaching of delta-pressure transducers across an orifice in the exhaust gas path are not conventionally, or easily made into, removable installations. Nor is there any mention in the reference that these flow monitoring points are removed after being used. Therefore, Appellant submits that a *prima facie* case of obviousness has not been established, and requests that the §103(a) rejection be removed.

Specifically regarding claim group 6 (to the extent that the §103(a) rejection includes claim 30), Appellant fails to see where the cited references teach or suggest the claimed limitation of operating the CVD arrangement under simulated processing conditions to detect the concentration of the supplied gas. The Examiner did not cite a particular portion of either reference that teaches this feature. Therefore, Appellant submits that a *prima facie* case of obviousness has not been established and requests that the §103(a) rejection be removed.

If the Examiner is asserting that detection of a depleted gas supply, or any of the other above-mentioned features, is inherently present in the asserted combination, evidence of such inherency argument has not been properly established. To establish inherency, the extrinsic

evidence "must make clear that the missing descriptive matter *is necessarily present in the thing described in the reference*, and that it would be so recognized by persons of ordinary skill." *Continental Can Co. v. Monsanto Co.*, 948 F.2d 1264, 1268, 20 U.S.P.Q.2d 1746, 1749 (Fed. Cir. 1991) (emphasis added). "Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient." *Id.* at 1269, 20 U.S.P.Q.2d at 1749 (quoting *In re Oelrich*, 666 F.2d 578, 581, 212 U.S.P.Q. 323, 326 (C.C.P.A. 1981).

As such, the asserted combination of references fails to teach all limitations of the claimed invention, the §103(a) rejection is improper and should be removed.

Issue 4: The §103(a) rejection of claim groups 1-6 over the asserted combination of references (*Jeng et al.* '073 in view of *Bartholomew et al.* '080) is not proper when the Examiner failed to cite any evidence of motivation in the prior art to modify the '073 reference.

The §103(a) rejection of the above-mentioned claim groups (to the extent that the §103(a) rejection includes claims 28-30) over the '073 reference in view of the '080 reference is improper because the Examiner failed to provide evidence of teaching or suggestion of motivation from the prior art for making the asserted modification of the '073 reference. A *prima facie* case of obviousness requires: (1) complete correspondence between the asserted prior art and the claimed invention; (2) evidence of motivation that the skilled artisan would be led to modify the asserted teaching; and (3) a reasonable expectation of success of the proposed combination. In this instance, no evidence has been presented in support of the assertion that the skilled artisan would be led to modify the teachings of the '073 reference as asserted in the Office Action to arrive at the claimed invention.

The Office Action acknowledges that the '073 reference fails to teach, *inter alia*, "controlling the introduction of the gases through a sensor or detector" (Office Action, ¶ 2, p. 2). First, the above-mentioned features are not an accurate characterization of the claimed limitations of the present invention. To the extent that the rejection is based upon a general characterization of claimed limitations, rather than on the actual claimed limitations, analysis of the general characterization with respect to cited references is meaningless. Distilling an invention down to the "gist" or "thrust" of an invention disregards the requirement of

analyzing the subject matter "as a whole." *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984). *See also*, M.P.E.P. §2141.02.

To the extent that the Office Action attempts to overcome a deficiency in the teaching of the '073 reference by identifying an allegedly corresponding limitation in the '080 reference, such an attempt to find complete correspondence between the asserted prior art and the claimed invention attempts only to satisfy the first component of the *prima-facie* obviousness test. The Examiner fails to provide any motivation for modifying the '073 patent as suggested. Specifically, the Office Action merely concludes:

it would have been obvious to one of ordinary skill in the art to use a CVD arrangement that would control the introduction of the gases according to the concentration or other characteristics of the gases for the disclosed intended purposes of Bartholomew et al. of controlling the reaction as the flow rate of gases affect the extent and uniformity of the deposition reaction.

The above statement is not evidence of motivation to combine references, but rather a hindsight-based recitation of the characteristic of the '080 reference.

Relevant case law indicates that a §103(a) rejection must be supported by evidence of motivation found in the prior art (*see, e.g., In re Dembiczak*, 175 F.3d 994, 50 USPQ2d 1614 (Fed. Cir. 1999)). In order to modify the '073 reference, the Examiner must specifically identify clear and particular reasons that indicate why one of ordinary skill in the art would have been motivated to select the missing claim limitations and modify the underlying reference with them. (*See, e.g., In re Dembiczak*). Evidence of motivation must be specifically identified and shown by some objective teaching in the prior art leading to the modification. "Our court has provided [that the] motivation to combine may be found explicitly or implicitly: 1) in the **prior art references** themselves; 2) in the knowledge of those of ordinary skill in the art that certain **references**, or disclosures in those references, are of special interest or importance in the field; or 3) from the nature of the problem to be solved, 'leading inventors to look to **references** relating to possible solutions to that problem.'" *Ruiz v. A.B. Chance Co.*, 234 F.3d 654, 57 U.S.P.Q.2d 1161 (Fed. Cir. 2000). In the present case, the final Office Action failed to provide prior art evidence that indicates why one of ordinary skill in the art would be motivated to look to modify the '073 reference with teachings of the '080 reference. The purported statement of motivation above is too

general, since it may be applied in an attempt to justify virtually any type of pad conditioning modification and does not provide motivation for making the specific modification asserted.

The Office Action has not cited a portion of the '073 reference that establishes the need for altering the '073 reference. The Examiner merely relies on the disclosure of the present invention as a blueprint for piecing together the missing limitations in the '073 reference. Combining limitations without evidence of such a suggestion, teaching, or motivation simply takes the inventor's disclosure as a blueprint for piecing together the prior art to defeat patentability—the essence of hindsight. *See, e.g., Interconnect Planning Corp v. Feil*, 774 F.2d 1132, 1138, 227 U.S.P.Q. 543, 547 (Fed. Cir. 1985) (“The invention must be viewed not with the blueprint drawn by the inventor, but in the state of the art that existed at the time.”) Such hindsight modification is improper and, therefore there is no suggestion or motivation to make the proposed modification. Thus, the asserted modification(s) of the '073 reference lacks motivation and the §103(a) rejection based upon the proposed modification(s) should be reversed.

Additionally, Appellant submits that the Examiner did not provide any evidence of an expectation of success in modifying the '073 reference with the '080 reference. For example, a reading of the first paragraph of column 4 of the '073 reference, teaches a detailed process of forming a first isolation cap layer. There is no mention of the layer requiring uniformity. If uniformity was necessary or a goal of the '073 process, it would be included in the discussion. As such, modifying the teachings of the '073 reference with the '080 reference for the intended purpose of the '080 reference as indicated at page 3 of the Office Action, controlling the reaction as the flow rate of gases affect the extent and uniformity of the deposition reaction, would unnecessarily add complexity to the '073 process. According to long-standing case law, the modification of the '073 reference in this regard is improper and cannot be maintained because such a modification is not evidenced by the prior art and is inconsistent with the intended purpose of the embodiment of the '073 reference. *See, e.g., In re Gordon*, 733 F.2d 900, 221 U.S.P.Q. 1125 (Fed. Cir. 1984).

Accordingly, because the Examiner failed to cite any evidence in support of the alleged motivation and/or the prior art teaches away, the §103(a) rejection cannot be sustained.

Issue 5: The rejection introduced in the Advisory Action is not proper when the Examiner failed to present the rejection in a timely manner and the substance is erroneous.

In the Advisory Action, the Examiner argued that “a gas injector adapted to maintain uniform supply of the gas in a zone of the CVD arrangement that would exhibit a depleted gas supply absent the injector” is a functional recitation that has not been given patentable weight because the recitation is not expressed as a “means” for performing the specified function as set forth in 35 U.S.C. §112(6). Appellant submits that such rejection has not been addressed previously and to do so in the Advisory Action is untimely. The timing prevents Appellant the opportunity to respond and violates current U.S. patent laws, including, but not limited to, 35 U.S.C. §132 and 37 C.F.R. §1.104(a)(2) as discussed above.

Moreover, the substance of the Examiner’s rejection is erroneous. Under §112(6), the term “means for” invokes a statutory interpretation with respect to the relationship between the recited structure and the associated function. According to the M.P.E.P., generally recited structure (such as “mechanism for”) also invokes §112(6) and is to be construed as a “means plus function” term. Recent case law has introduced another component into the equation: *i.e.*, use of “means for . . .” presumes that the scrivener intended to invoke §112(6), and nonexpress use of “means for . . .” language presumes that the scrivener did not intend to invoke §112(6). Relating to Appellant’s claim 19, the alternative terms “a gas injector to” and “a gas injector adapted to” are, therefore, not improper simply because they are not expressly invoking §112(6).

Further, the terminology “adapted to” is accepted terminology in U.S.P.T.O. practice in defining an element of the claimed invention in functional terms. *See*, M.P.E.P. §2173.05(g). The use of “adapted to” is supported by case law as being proper terminology for defining attributes that a structural element possesses. *In re Venezia*, 530 F.2d. 956, 189 U.S.P.Q. 149 (CCPA 1976) (“members adapted to be positioned”... serve to precisely define present structural attributes of interrelated component parts of the claimed assembly.”) In addition, the “adapted to” terminology rejected by the Examiner has become well accepted in PTO practice as an alternative to “means for” language under 35 U.S.C. §112(6). *See also*, M.P.E.P. §218; *See, DeGraffenreid v. United States*, 20 Ct. Cl. 458, 16 U.S.P.Q.2d 1321 (Ct. Cl. 1990) (“adapted to provide...”). Further,

a sampling of the U.S. Patent Office's own database, from 1991 to 2001, indicates that the term "adapted" has been used in the claims of over 162,000 issued patents. Finally, it is well recognized in Patent Office practice that it is not inherently wrong to define some part of an invention in functional terms. *See* M.P.E.P. §2173.05(g) ("Functional language does not, in and of itself, render a claim improper." *See also, In re Swinehart*, 439 F.2d 210, 169 U.S.P.Q. 226 (C.C.P.A. 1971)).

Appellant submits that the Examiner's rejection presented in the Advisory Action is untimely and erroneous; therefore, the rejection cannot stand.

IX. Conclusion

In view of the above, Appellant believes the claimed invention to be patentable. Claims 18-30 remain for consideration. Appellant respectfully requests reversal of the rejections as applied to the appealed claims and allowance of the entire application.

Please charge Deposit Account No. 01-0365 (TT4037) in the amount of \$320.00 for filing a Brief in support of an appeal as set forth in §1.17(c).

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APPENDIX OF APPEALED CLAIMS (09/575,349)

18. A system for forming a coating on a surface of a semiconductor wafer in a CVD arrangement, the system comprising:

means for supplying a uniform supply of gas to the surface of the wafer, the surface being in a zone of the CVD arrangement that exhibits a depleted gas supply absent the injector; and

means for using the supplied gas in combination with selected reactants to deposit a coating on the wafer.

19. A method for forming a coating on a surface of a semiconductor wafer in a CVD arrangement, the method comprising:

supplying gas to the surface of the wafer using a gas injector adapted to maintain uniform supply of the gas in a zone of the CVD arrangement that would exhibit a depleted gas supply absent the injector; and

using the supplied gas in combination with selected reactants and depositing a coating on the wafer.

20. The method of claim 19, wherein supplying gas to the surface includes supplying gas in different quantities to different zones of the CVD arrangement.

21. The method of claim 20, wherein the different quantities are selected to compensate for a gas depletion rate associated with the selected zone of the CVD arrangement to which the injector supplies gas.

22. The method of claim 19, wherein the gas includes at least one of: ammonia and dichlorosilane.

23. The method of claim 19, wherein depositing a coating on the wafer includes depositing an anti-reflective coating having uniform optical properties.

24. The method of claim 23, wherein the anti-reflective coating is deposited having a k value of refractive index that is between about 0.6 and 0.8.
25. The method of claim 23, further comprising performing photolithography on the wafer using the anti-reflective coating.
26. The method of claim 19, wherein depositing a coating on the wafer includes depositing a coating having uniform thickness.
27. The method of claim 19, further comprising adjusting the gas injector to maintain the uniform gas supply.
28. The method of claim 27, wherein adjusting the gas injector comprises:
providing at least one gas concentration detector in the CVD arrangement;
detecting the concentration of the supplied gas using the detector; and
in response to the detected concentration, adjusting the gas injector.
29. The method of claim 28, prior to depositing a coating on the wafer, further comprising removing the at least one gas concentration detector from the CVD arrangement after detecting the concentration of the supplied gas.
30. The method of claim 29, wherein detecting the concentration of the supplied gas using the detector includes operating the CVD arrangement under simulated processing conditions.